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Abbreviations.

e. P.	excessivement petite.
e. e. P.	excessivement, excessivement petite.
e. F.	excessivement faible.
e. e. F.	excessivement, excessivement faible.
E.	étendue.
m. E.	modèrement étendue.
t. P.	très petite.
t. F.	très faible.
R.	Ronde.
i. R.	Irrégulièrement ronde.
I.	Irrégulière.
g. B. M.	Graduellement brillante des bords au centre.
Vap.	Aspect vaporeux.
P. B.	point brillant.
Cond. au C.	Condensation au centre.
Ov.	Ovoide.
All.	Allongée.

Etoiles de Comparaison. Positions moyennes adoptées pour 1872·0.

		R.A.			P.		
		h	m	s	°	′	″
a	93 W. H. xvii. (8·9) N. C.	17	4	34·74	49	40	9·4
b	2852 Arg. Z. + 45° (9·4)	19	8	35·00	44	11	25·8
c	697 W. H. xx. (9) A. C.	20	28	22·59	95	1	56·1
d	311 W. H. xxi. (9) N. C.	21	13	54·35	51	22	34·2
e	778 W. H. xxi. (9) A. C.	21	33	36·40	97	23	31·5
f	730 W. H. xxi. (8) A. C.	21	31	58·74	94	9	29·6
g	4677 Arg. Z. + 10° (9·0)	21	55	48·20	79	28	8·3
h	4697 Arg. Z. + 38° (9·3)	22	4	46·80	51	53	7·5
i	43557 Lalande (8)	22	12	54·35	71	21	9·4
k	218 W. H. xxii. (7·8) A. C.	22	11	53·49	74	14	57·0
l	354 W. H. xxii. (8) N. C.	22	16	41·26	60	17	16·6
m	4721 Arg. Z. + 34° (9·5)	22	29	3·90	55	48	28·0
n	791 W. H. xxii. (9) N. C.	22	34	27·21	55	6	31·1

A Self-recording Transit Micrometer.
By the Rev. S. J. Perry.

At the November meeting of the Society in 1871, a paper was read by Professor A. Herschel on a self-recording transit micrometer. The principle was ingenious and simple, but the difficulties in practice appeared great on account of the arrangement of the springs. The nice adjustment of strength, that must

TO ILLUSTRATE M^R. PERRY'S PAPER ON "A TRANSIT MICROMETER".

Fig. 1.

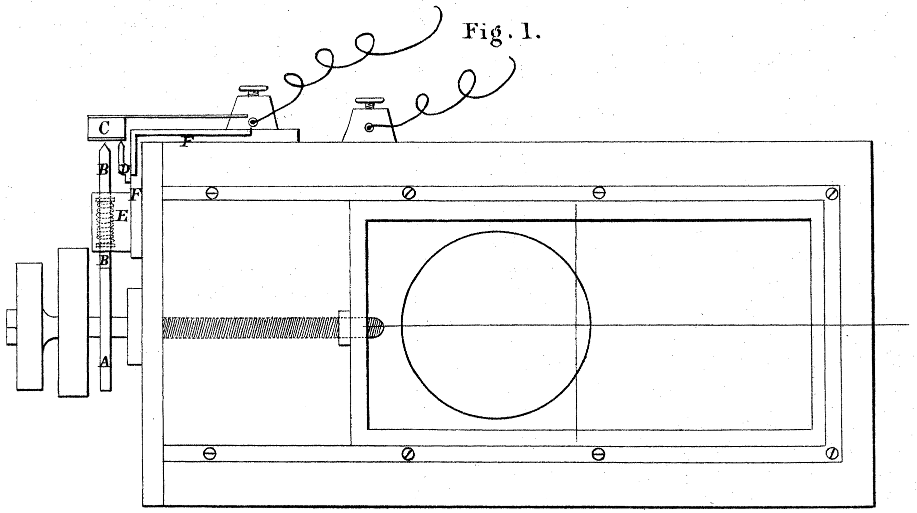


Fig. 2.

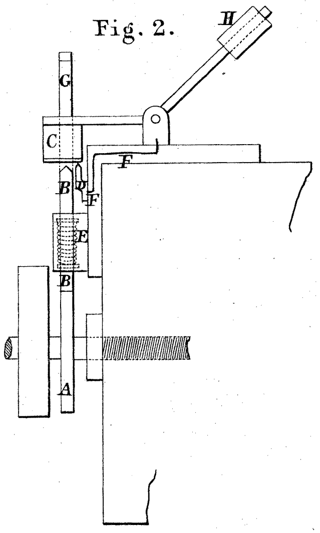


Fig. 3.

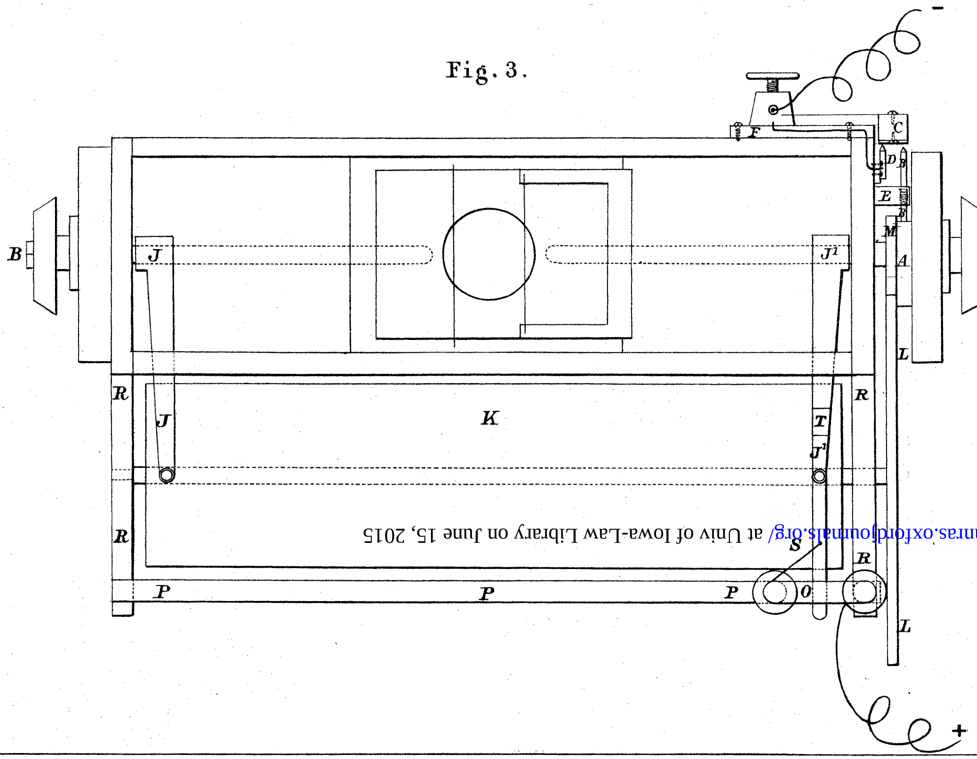
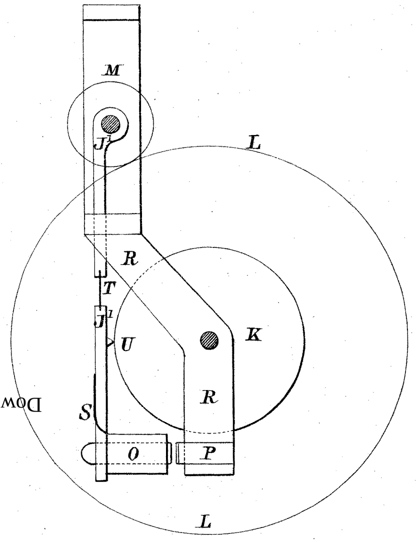


Fig. 4.



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be first obtained, and then preserved, so that the first spring may be completely compressed before the rest are at all disturbed, and then the second be similarly compressed, and so on, appears scarcely capable of attainment. I venture, therefore, to propose a simpler method of arriving at the same desirable result. A few words, with the annexed figure, will suffice to explain the idea, which has been suggested to me by Mr. J. Hostage, the first assistant at this observatory.

An excentric disk A, Fig. 1, moving with the micrometer screw, lifts a rod B, whose upper surface is tipped with platinum, and which, whilst rising, gently compresses the spiral spring, E, placed within an insulating guide. When B reaches C, whose lower surface is of platinum, and which rests on a platinum point D, the contact completes the circuit, which is instantaneously broken again by the removal of C from D, from the continued upward motion of B. As B is forced down from its highest point by the spiral spring a second circuit is made and broken as C reaches D. Two observations will thus be registered on the chronograph at each revolution of the screw, and they can obviously be arranged, so that the intervals shall be all equal.

If a single observation at each revolution of the screw is preferred, the following arrangement may be adopted to prevent the second contact.

Instead of the straight spring, that keeps C in position, a weight H, Fig. 2, is made to balance C in such a manner that almost as soon as B has raised C above D, H will remove C from contact with B. The projecting piece G, attached to B, will force C down again upon D as B approaches its lowest point.

The pitch of the screw will regulate the number of transit observations required without any additional contrivance, and the intervals, corresponding to a whole or half revolution of the screw, will all be equal.

The micrometer will work equally well in both directions.

The upper part of C, and the whole of F, must be made of an insulating substance. A wire through F connects D with one of the poles of the battery, the other pole being in direct connexion with the micrometer frame. The battery connexions are the same for any number of transit wires, and can easily be kept in order.

The whole self-recording apparatus being external to the micrometer can readily be applied to an existing apparatus.

Stonyhurst Observatory,
February 12th, 1873.

Addendum.—The utility of the preceding arrangement for a self-recording micrometer will be made more apparent by showing that it is applicable to other observations besides those of transit.

Fig. 3 represents a modification of the ordinary parallel wire micrometer, adapted for the permanent record of the angular

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distances between any bodies that can be brought within the same field of the micrometer, and giving at the same time the exact instant at which such measures were taken.

The micrometer screws differ from those of an ordinary instrument in having a wider pitch of thread near the screw heads than towards the centre of the micrometer, so that the former may give a greater horizontal movement to the arms I and I′ than that of the wires in the field of view.

A light brass cylinder K, on which metallic paper may be secured by clamps, rests on bearings attached to the base plate of the micrometer, the lower part of which is slotted so as to guide the arms I and I′. This cylinder moves with the micrometer screw α, being kept in motion, whilst the measurements are being taken, by a small toothed wheel *m* attached to the spindle of the screw, and gearing into the large wheel L on the axis of the recording cylinder.

The instrument is adapted for the observation of the passage of a spot, or of an inferior planet, across the solar disk, or for measuring the near approach of the Moon to celestial bodies, and it might be of use in the transit of the shadows of *Jupiter's* satellites, which are better seen when well on the disk than at first or last contact. Distances between double stars, diameters of planets, and similar observations, might also be recorded in this way, but then the chronograph connexion would be unnecessary, and the space traversed by either wire being small, a very enlarged movement might be given to the recording arms.

The working of the instrument will be easiest understood by considering its application in some particular case, such as the micrometric measurements of *Venus* in transit. The wire moved by the screw that actuates I must be kept always tangent to the Sun's limb, the brass point at the extremity of I being in continuous contact with the metallic paper. As the cylinder K rotates the brass point of I will describe a line more or less straight according to the steadiness of the driving power of the equatorial clock.

The second wire of the micrometer, which moves with I′, is made to follow the preceding or following limb of *Venus*. As this screw rotates it imparts a slow motion to the recording cylinder, and at a fixed reading of the micrometer it also completes the galvanic circuit by raising B to C, as explained for the transit micrometer.

A small electro-magnet, introduced in the circuit at the lower extremity of the arm I′, brings the brass point or sharp pricker of I′ into connexion with the recording cylinder at the same instant that the time-singal is registered on the chonograph. The electro-magnet may be conveniently brought down on to a bar of soft iron P, which will serve at the same time to strengthen the frame. A covering of thin brass for P will prevent adhesion when the circuit is broken. The wire S forms the connecting link between the electro-magnet, and the brass micrometer.

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Fig. 4 is a side view of the revolving cylinder and driving wheel. T is a spring that allows the electro-magnet to bring down the pointer of I′ on the cylinder at *u*.

The great advantage of this instrument depends on there being no necessity of reading the micrometer during the observation, but the value of the scale on the cylinder can be tested by readings at other times.

Stonyhurst Observatory,
March 10th, 1873.

Search for Vulcan. By H. C. Russell, Esq.

(*From a Letter to the Honorary Secretaries.*)

I send you the enclosed note for the *Notices*, as it is probable many in reply to Mr. Hind's invitation will have been on the look out for the supposed planet.

Circumstances here were specially favourable on the 24th March, the sky being clear all day.

I used the 7¼-inch refractor, and at times an unsilvered 10⅜-inch glass reflector, with both of which the very rapid changes going on in the large spot were distinctly seen during the day.

The mail closes this morning at 10 A.M., so I am obliged to send the results obtained to 9 A.M.

A careful watch was kept for the supposed planet all day of the 24th, but nothing could be seen at all like it. Regular observations were also made on the 21st, 22nd, and 23rd, with no better result.

This morning the sun rose obscured by the clouds, and was not observed until 9 A.M., when nothing except the sun-spots could be seen.

Sydney Observatory,
25th March, 1873.

A Second Catalogue of New Double Stars, discovered with a 6-inch Alvan Clark Refractor. By S. W. Burnham, Chicago, U.S.A.

Nearly all of these double stars have been found since the preparation of the former catalogue. The exceptions are where some uncertainty existed as to the real duplicity of the star, or where the distance and angle had not been sufficiently observed. The 6-inch Clark Refractor, previously referred to, has been used exclusively. From a careful examination of a General Catalogue of Double Stars (in manuscript), comprising substantially, if not entirely, every double star known, I have little doubt that the following are now noted for the first time as double stars. The numbers are continued from the first list. The position angles and distances are estimated in all cases.